

Armed Forces College of Medicine

AFCM



THE SCALP

By

Professor Azza Kamal







Intended **L**earning **O**utcomes

By
student will be able to:



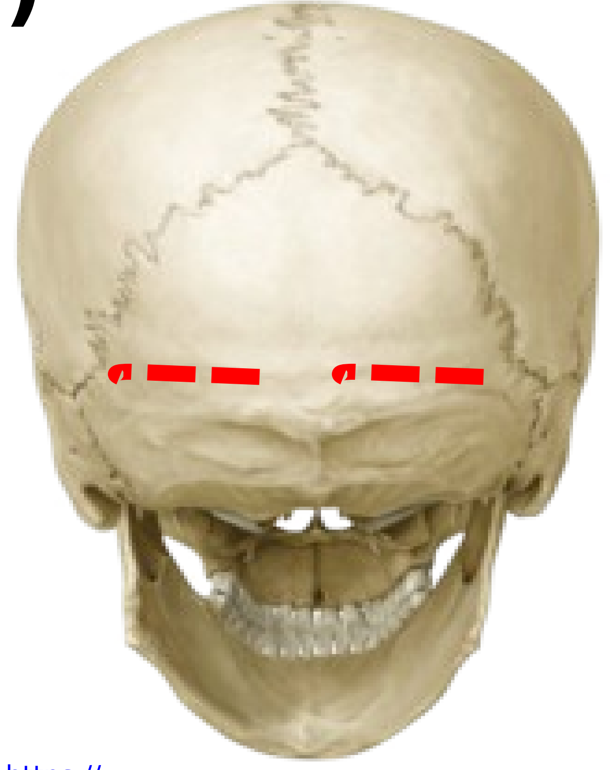
1. **List layers of the scalp .**
2. **Correlate layers of the scalp with its relevant applied anatomy.**
3. **Describe the attachments, action & nerve supply of the muscle of the scalp.**
4. **Discuss the blood supply & nerve supply of the scalp with special emphasis on sites to feel arterial**

KEY POINTS OF THE LECTURE

1) **Layers** of scalp with relevant **applied anatomy**
2) Attachment , action and nerve supply of **occipitofrontalis** muscle
3) **Blood supply** of scalp
4) **Nerve supply** of scalp

The scalp is the soft tissue that covers the vault of skull (skull cap)





https://lh3.googleusercontent.com/bj5RPNroaYFjGuCDaeea

It extends from superior orbital margin

to highest nuchal





https://lh3.googleusercontent.com/LGSpETjCYdDWEvc2ayTcY

Scalp is attached laterally to the superior temporal lines



https://
www.google.com.eg/search?sa=G&hl=en-EG&q=b
es+of+the+skull

LAYERS OF SCALP



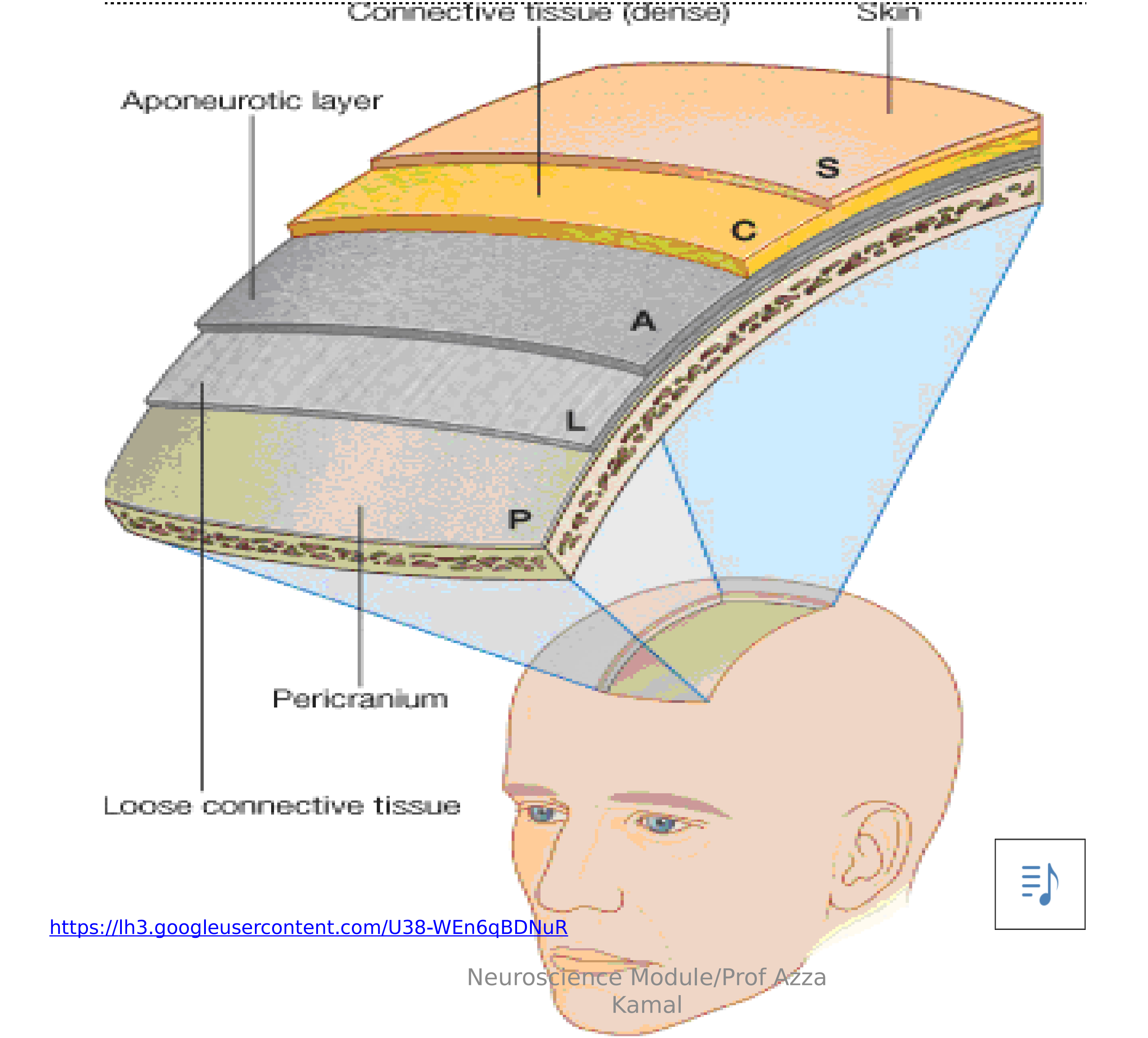
S : **S**kin

C : **C**onnective tissue

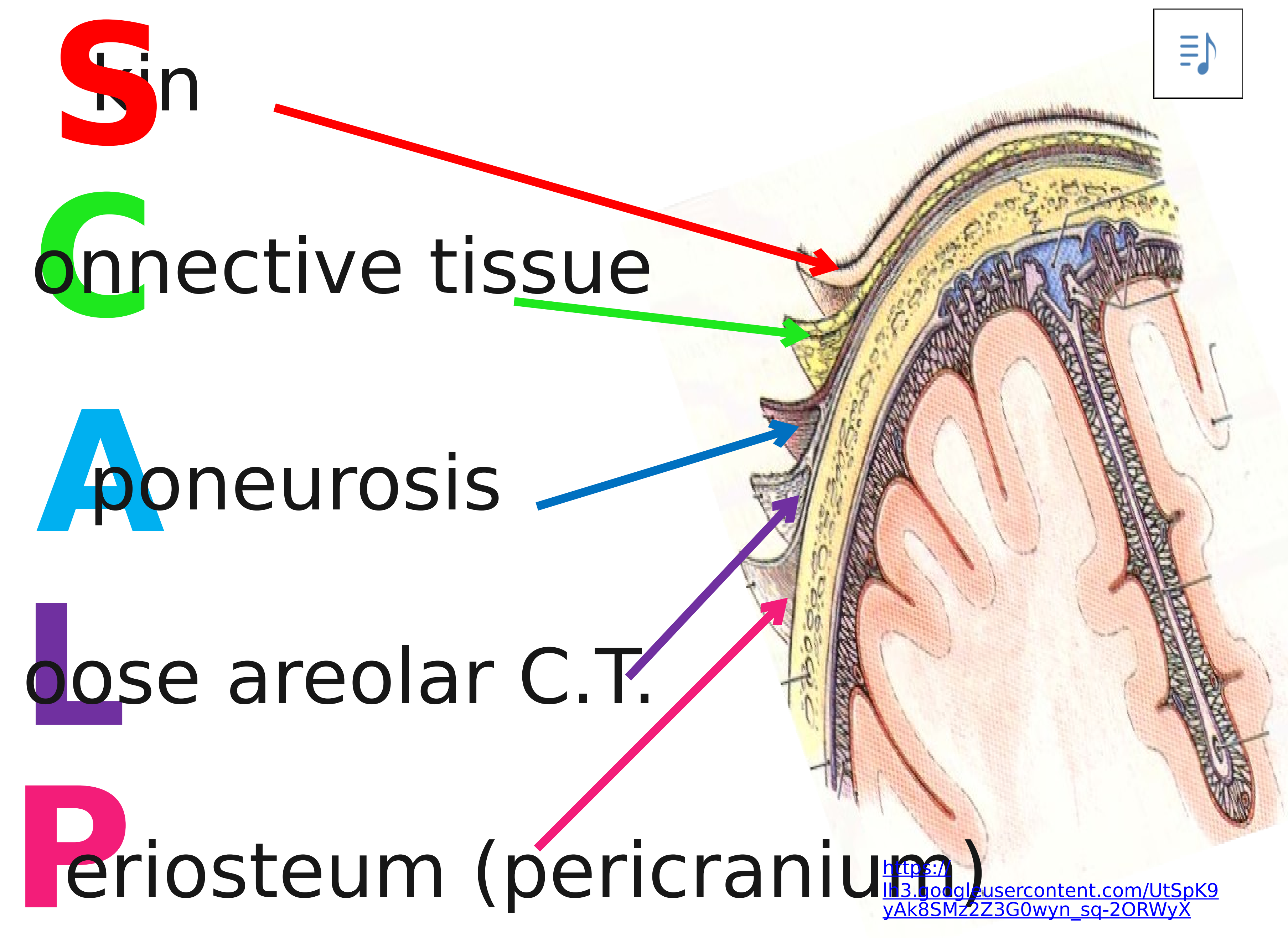
A : **A**poneurosis of Occipito-frontalis muscle

L : **L**oose areolar tissue

P : **P**ericranium



https://lh3.googleusercontent.com/U38-WEn6qBDNuR


Skin
Connective tissue
Aponeurosis
Loose areolar C.T.
Periosteum (pericranium)
https://lh3.googleusercontent.com/UtSpK9yAk8SMz2Z3G0wyn_sq-2ORWyX



Ski

ry and rich in sweat and sebaceous glan





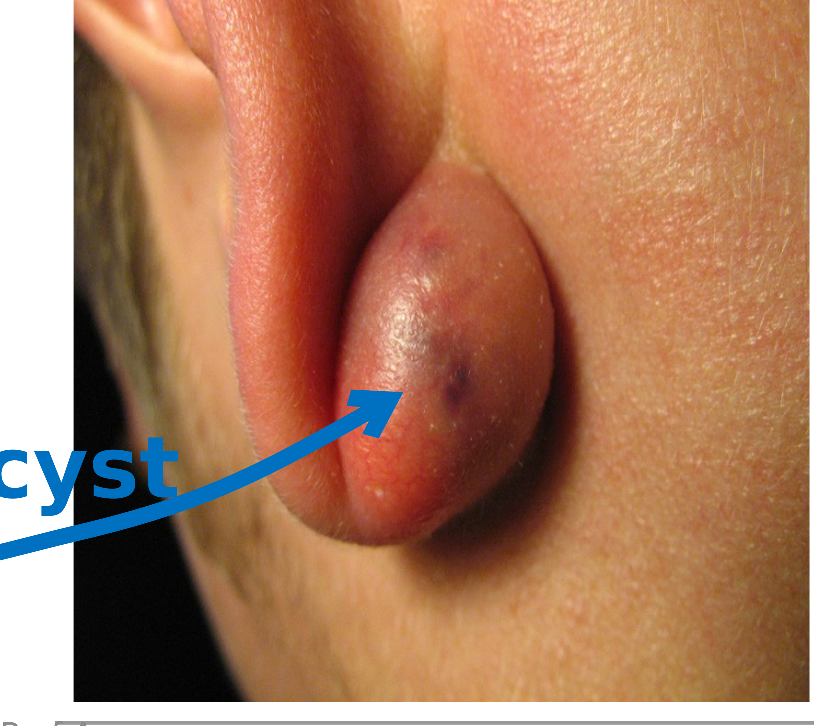
Infection in a sebaceous gland or blockage of duct draining a sebaceous gland sebaceous cyst



https://www.google.com.eg/search?sa=G&hl=en-EG&q=sebaceous+cyst

a sebaceous cyst of the sca

n infected sebaceous cyst behind the ear



https://lh3.googleusercontent.com/9bg69rFKWkF5pOC0LOC4-Nq1T

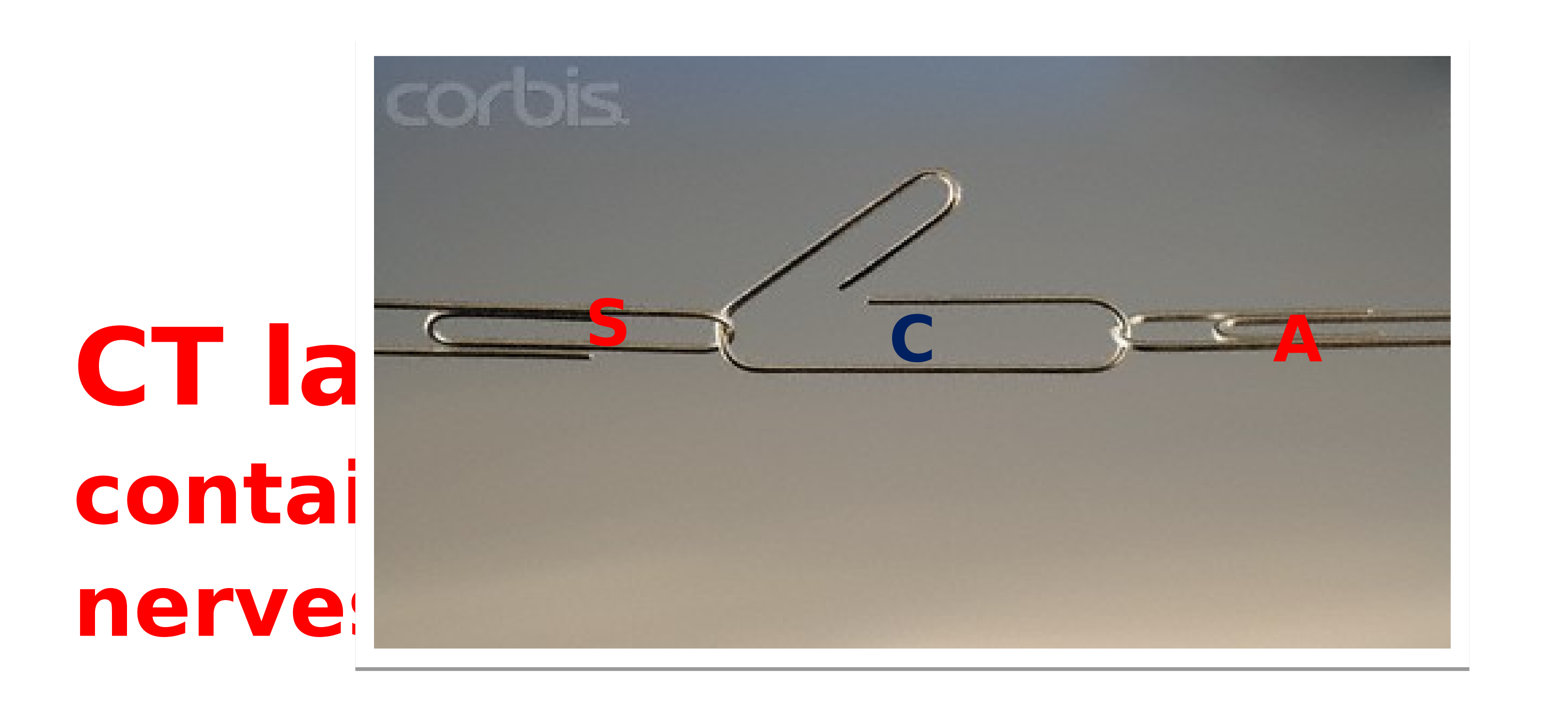


Connective tissue

CT la

contai

nerves



CT layer connects the skin (layer 1) with the aponeurosis (layer 3) (all 3 layers move as one unit) □ scalp proper

Infection in this layer remains localised

because of the dense

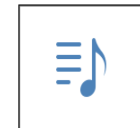
https://lh3.googleusercontent.com/MaV4Mha7oUsjl



Dense CT is adherent to the walls of arteries so if an artery is cut, it bleeds profusely (sooo much) as the dense CT prevents the artery from contraction or retraction.

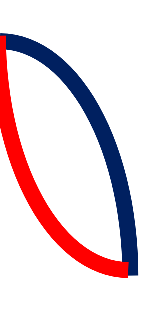


Control bleeding from scalp by direct pressure on the wound



Wounds in this dense CT layer do not gap

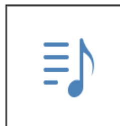
ges of wound that do not g



Edges of wound gap if the cut reaches the







IN the dense CT layer of scalp:

- **Infection tends to remain localized**
- **Wounds do not gap.**
- **A small wound causes profuse bleeding**

because the walls of arteries adhere to the CT



Aponeurosis



EPICRANIAL APONEUROSIS

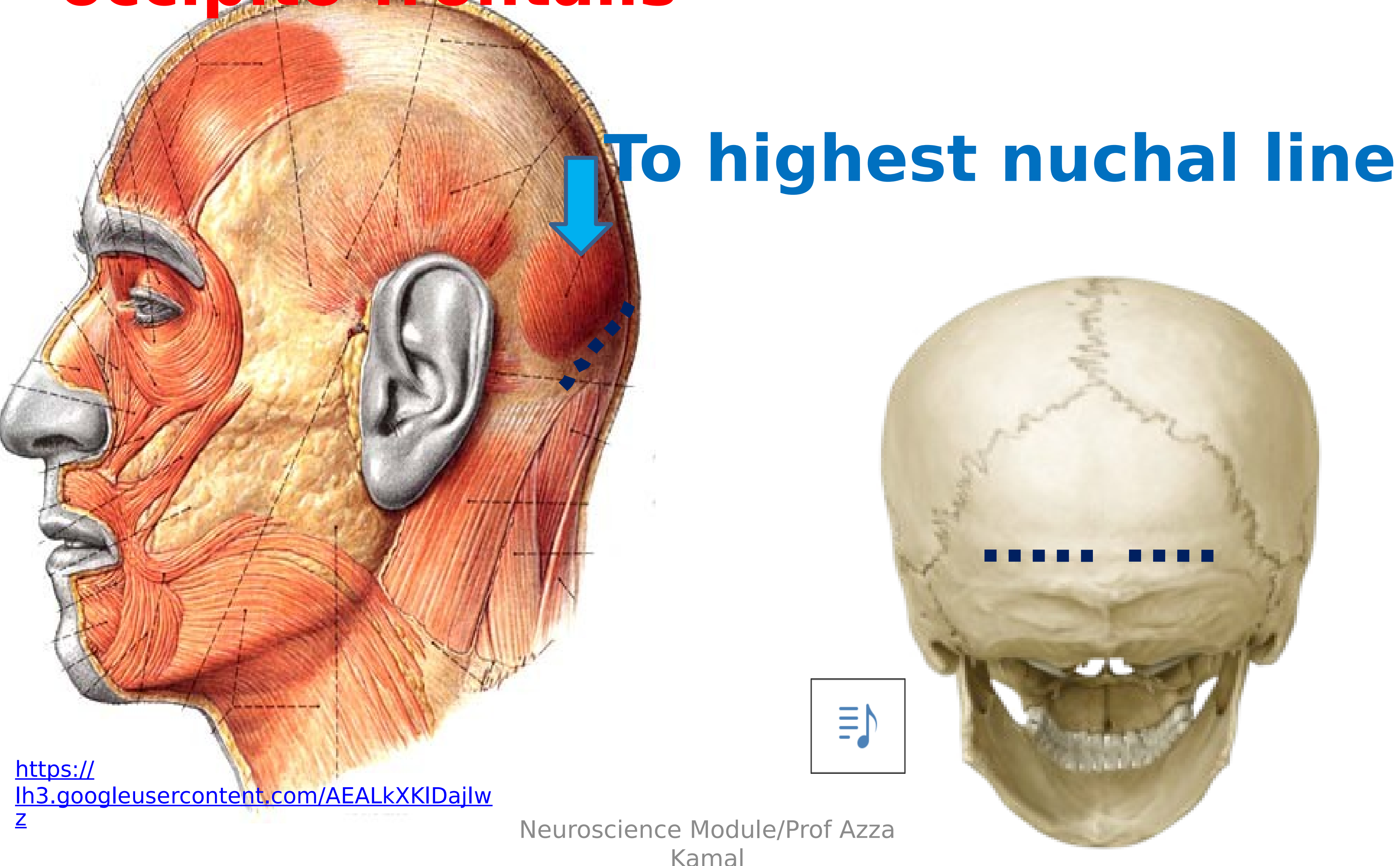
Occipital Bellies

Occipito-frontalis muscle

Frontal Bellies

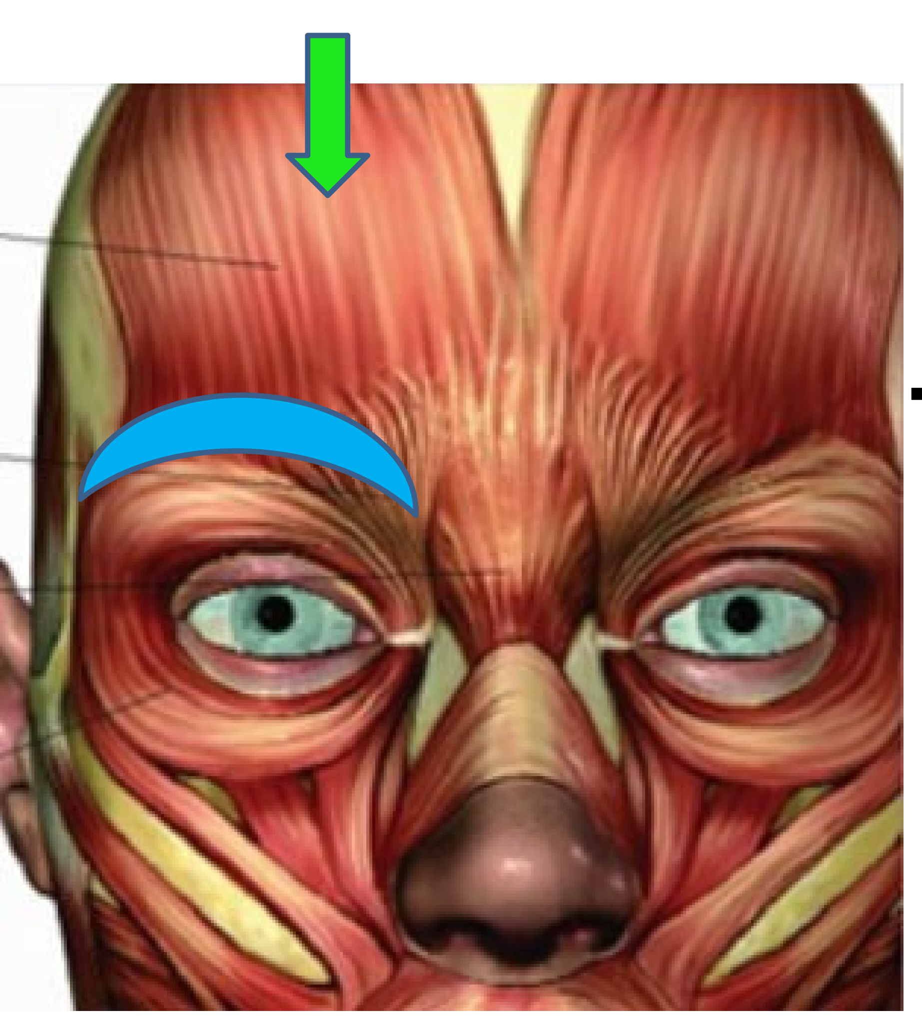
https://lh3.googleusercontent.com/1KBoxlbDsGq_IQ90U3pu

Attachment of occipital belly of occipito-frontalis



https://lh3.googleusercontent.com/AEALkXKlDajlwz

chment of frontal belly of occipitofro



To skin of eyebrow



https://lh3.googleusercontent.com/hts9IaCTiKmeBsG20SA5zf3WzOMZ13

Occipito-Frontalis Muscle

- **Frontal bellies:** skin of eye brows
- **Occipital bellies:** highest nuchal line

Action:

- frontal bellies raise eye brows□produces transverse wrinkles in forehead
- occipital bellies pull scalp backwards



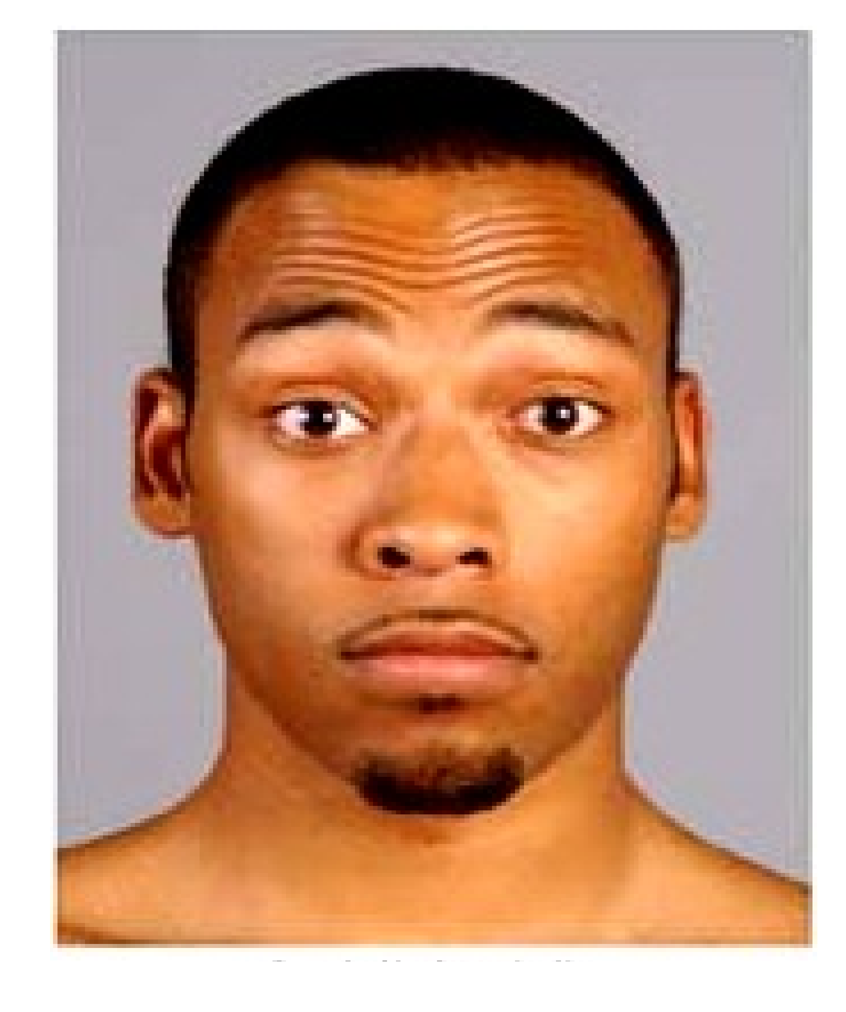
A wound cutting the epicranial aponeurosis in the coronal plane gaps due to contraction of frontal & occipital bellies of occipito-frontalis and



https://www.google.com.eg/search?sa=G&hl=en-EG&q= …calp+wound

Which of the following is responsible for the facial expression in this photo (raised eyebrows & transverse wrinkles in forehead) ?

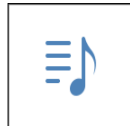
a) Frontal bellies of occipitofrontalis
b) Occipital bellies of occipitofrontalis
c) Aponeurosis of occipitofrontalis



MCQ to test attachment, action & nerve supply of occipitofrontalis muscle.



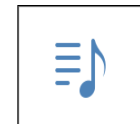

Loose areolar C.T



LOOSE AREOLAR C.T.

It is the site of collection of fluid, pus and blood, which can spread to the eyelids → black eye

Contains emissary veins (so infection may extend to intracranial venous sinuses)



Emissary Veins

Scalp

skull

Dural Venous sinus



https://www.google.com.eg/search?sa=G&hl=en-EG&q=arachnoid+villi

Emissary veins connect veins outside the skull with dural venous sinuses inside the skull .

Function of Emissary Veins

Emissary veins have NO valves .

They help to keep intracranial pressure constant.

Danger of Emissary Veins

They transmit infection from outside the skull to the inside.



Why is loose CT layer considered the dangerous area of scalp?

- **Allows spread of infection from outside to inside of skull due to presence of emissary veins .**

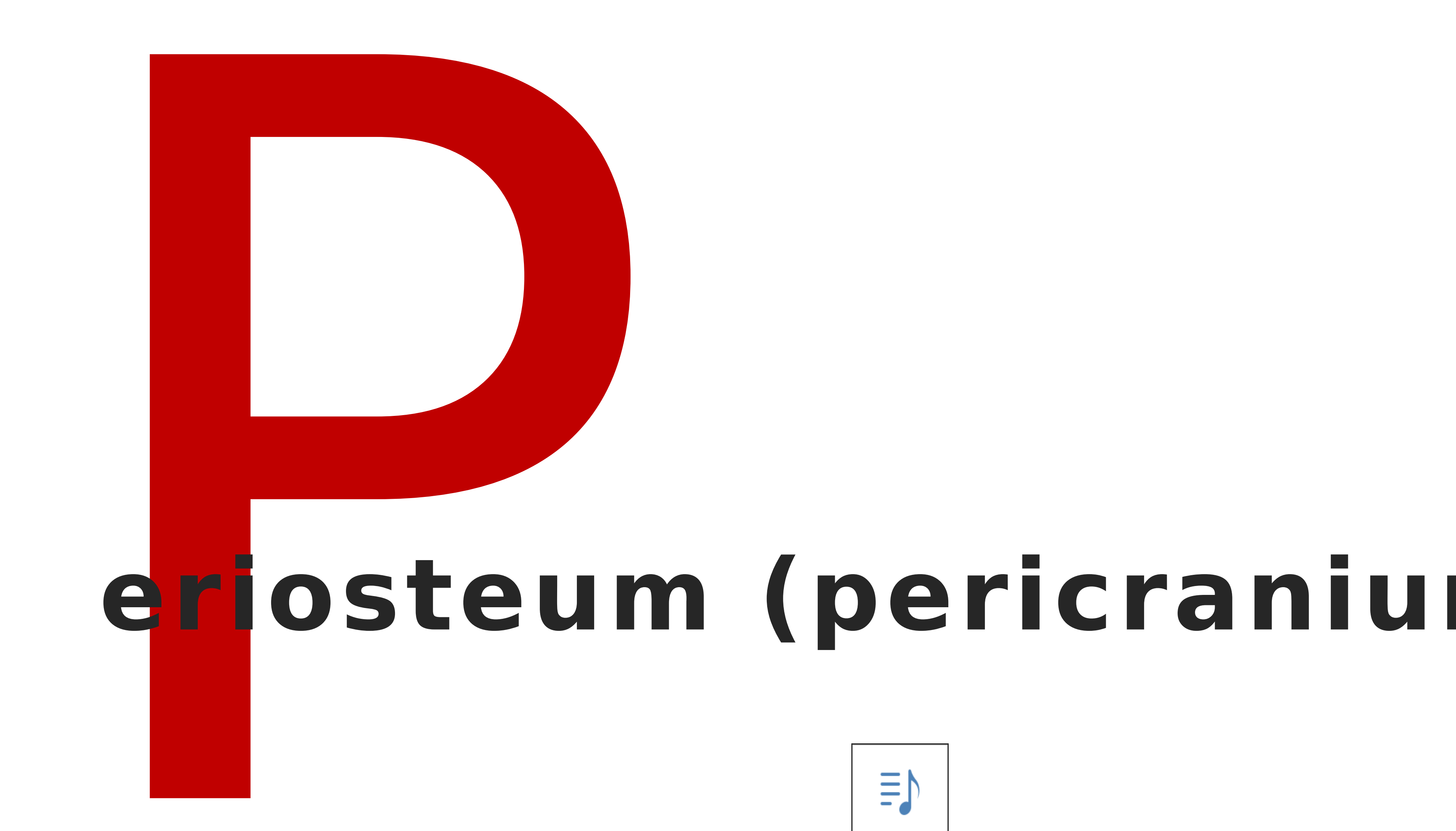
- **Allows collection of blood & pus .**





https:// lh3.googleusercontent.c 2_4kfXYKeAS3Q9xJwzu1

Blood or pus collected in the loose areolar CT layer cannot pass to back of neck because of attachment of occipital bellies of occipito-frontalis to the highest nuchal line , but can pass anteriorly since frontal bellies are not attached to bone (but to skin of eyebrows) therefore blood can enter the eyelids resulting in


P
eriosteum (pericraniu

Periosteum is loosely attached to skull bones, but firmly adherent to sutures so subperiosteal bleeding does NOT sprea[d ...] the shape of th[e ...] bone.

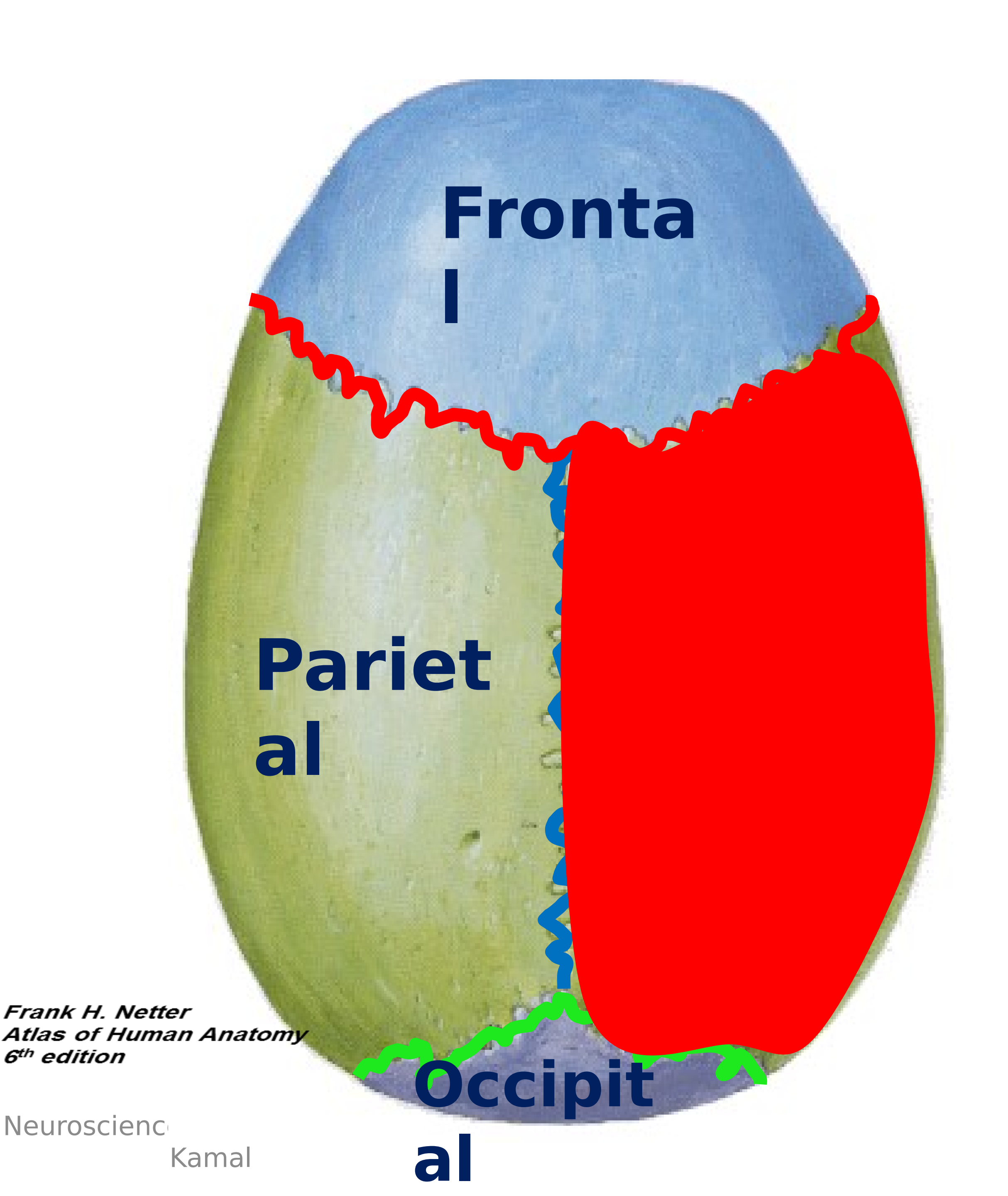
Hematoma beneath right parietal bone





https://lh3.googleusercontent.com/v8eHCKhQJ-DOum66m5Ga

Subperiosteal bleeding takes the shape of the underlying bone



Frank H. Netter
Atlas of Human Anatomy
6th edition





Infection in which layer of the scalp tends to spread ?

A. Skin
B. Dense connective tissue
C. Aponeurosis
D. Loose connective tissue
E. Pericranium



MCQ to test applied anatomy of layers of the scalp & relevant applied anatomy.

Arteries of Scalp

3 in front of auricle

2 behind auricle

Supratr ochlear

Supra orbital

Superficia l temporal

Posterior auricular

Occipi tal





Superficial Temporal

Occipital

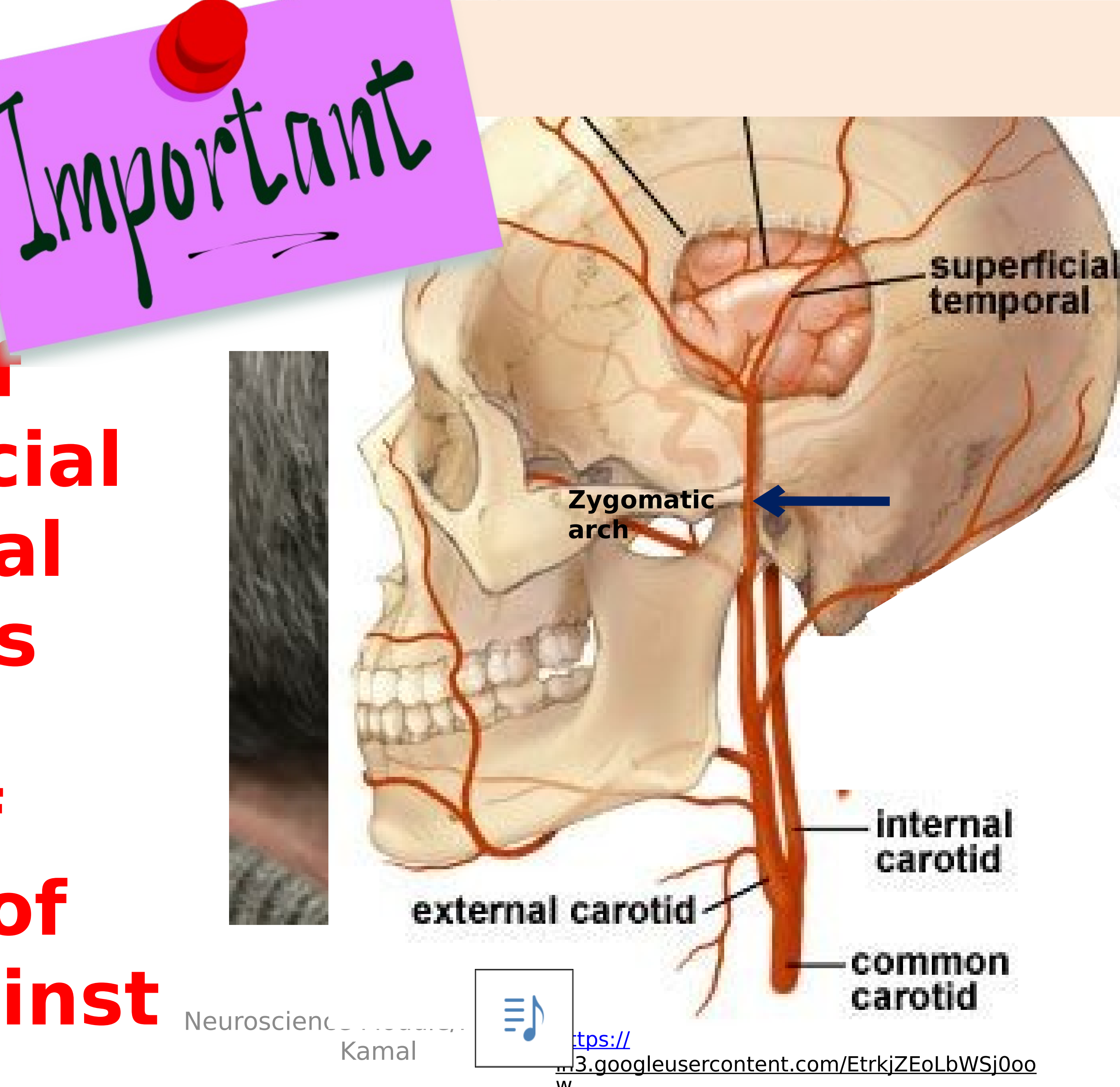
Posterior auricular

Supratrochlear & supraorbital brs of ophthalmic from Internal Carotid

Maxillary artery

External carotid

https://lh3.googleusercontent.com/RJ97ukjLAWAA9

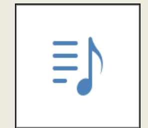


Pulse of superficial temporal artery is felt in front of tragus of ear against the

https://lh3.googleusercontent.com/EtrkjZEoLbWSj0oow

Veins of scalp

- Supratrochlear and supraorbital
- Superficial temporal vein
- Posterior auricular vein
- Occipital vein



MCQ



Which of the following arteries supplies the scalp in front of the auricle and is a branch of the external carotid artery?

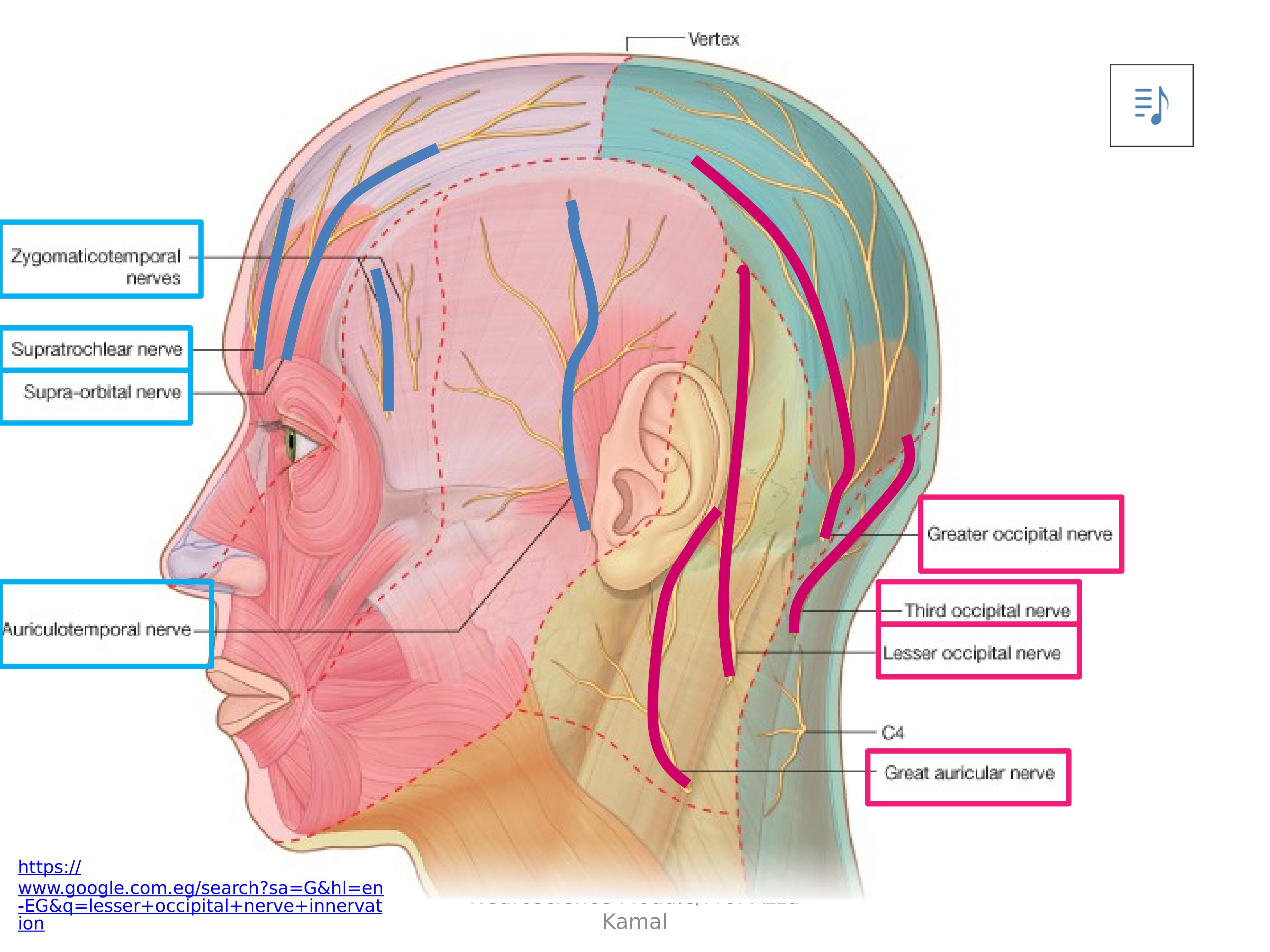
A. Supratrochlear
B. Supraorbital
C. Superficial temporal
D. Posterior auricular
E. Occipital

MCQ to test blood supply of the scalp.

Sensory Nerve Supply of Scalp

4 nerves in front of auricle brs from Trigeminal	4 nerves behind auricle brs from cervical nerves
1) Supratrochlear	1)Great auricular C 2,3
2) Supraorbital	2) Lesser occipital C2
3) Zygomaticotemporal	3) Greater occipital C2
4) Auriculotemporal	4) Third occipital C3





https://www.google.com.eg/search?sa=G&hl=en-EG&q=lesser+occipital+nerve+innervation

MCQ



Which one of the following is the motor nerve supply of the scalp?

A. Supratrochlear
B. Supraorbital
C. Auriculotemporal
D. Great auricular
E. Facial

MCQ to test nerve supply of the scalp.



Summary of important points

- ***The scalp is formed of 5 layers.***
- ***Infection of scalp remains localized if in the dense CT layer but spreads if reaches loose areolar CT layer.***
- ***Emissary veins can transmit infection from scalp to the cranial cavity.***
- ***Scalp is richly supplied by arteries derived from external & internal carotid.***
- ***Bleeding is profuse from scalp wounds because of the rich blood supply & arteries are prevented from contraction or retraction because of the dense CT attached to their walls***
- ***Sensory nerves supplying scalp are branches trigeminal (infront of auricle) & cervical spinal***



References : Gray's Anatomy for Students
Scalp P. 873-877